# REMARKS/ARGUMENTS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and the reasons that follow. Claims 5, 12, 16, 18, 29, 33, 35, 39, 41, and 45 have been amended. Support for the amendments can be found throughout the specification, specifically in paragraphs [0122], [0125], [0134], and [0135]. No new matter has been added. Upon entry of the amendments above, Claims 5-12, 16-18, 22-29, 33-35, 39-41, 45-52, and 57 will be pending in this application.

## I. Examiner Interview

Applicants thank the Examiner for the courtesy extended during the interview conducted on April 27, 2010 with Applicants' representative Nicholas Lagerwall. During the interview, the various rejections were discussed. No agreement was reached on the patentability of the claims.

## II. Drawing Objections

On page 2 of the Office Action, the drawings were objected to under 37 C.F.R. § 1.83(a) for failing to show every feature of the invention specified in the claims. Applicants respectfully traverse the rejection.

More specifically, the Examiner asserted that the "'synchronize circuit', 'delay measuring circuit in claims 5, 39, 45 must be shown." Claim 5 recites, in part, "synchronizing at least some of the plurality of optical network units with the second interface." Claim 39 recites, in part, "means for measuring round trip delays between the second interface and optical network units attached to the second interface" and "means for synchronizing at least some of the plurality of optical network units with the second interface." Claim 45 recites, in part, a "second interface [that] is configured to synchronize at least some of the optical network units with the second interface [and] to measure a round trip delay between the second interface and its attached optical network units." As such, Applicants respectfully submit that Claims 5, 39, and 45 do not recite a "synchronize circuit" or a "delay measuring circuit," as asserted by the Examiner.

Applicants respectfully submit that “means for measuring round trip delays,” “means for synchronizing,” and a “second interface ... configured to synchronize ... [and] to measure a round trip delay” are illustrated in the drawings of the present application. For example, paragraph [0116] of the specification states (with emphasis added):

> After a proper diagnosis of the fiber failure and enabling the second interface, an auto-discovery mechanism is performed in the second interface to synchronize ONUs with the second interface and measure the round trip delay between the second interface and its attached ONUs. Then the second interface will conduct round trip delay compensation and can start to send/receive traffic properly.

Paragraph [0126] of the specification further states:

> For achieving the aforementioned functionality for a colocation situation with optical detection such as that illustrated in FIG. 8a, interface 80 includes a starting component SM1 for starting an auto-discovery process to register affected optical network units. Interface 80 may further include an updating component UP for updating an internal routing table of the optical line terminal in response to the result of the auto-discovery process.

Fig. 8a is reproduced below for convenience:

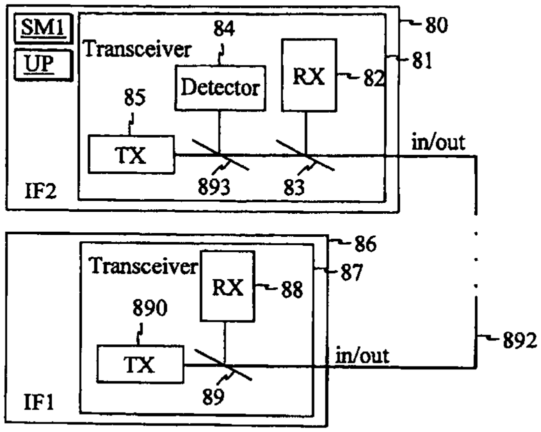

Fig. 8a

As such, Fig. 8a clearly depicts an "interface 80" and a "starting component SM1" that are configured to conduct an "auto-discovery process" to "synchronize ONUs" and "measure round trip delay." Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections to the drawings under 37 C.F.R. § 1.83(a)

## III. Claim Rejections Under 35 U.S.C. § 112, first paragraph

On page 3 of the Office Action, Claims 5, 39, and 45 were rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. Applicants respectfully traverse the rejection.

More specifically, the Examiner stated that the various elements in Claims, 5, 39, and 45 directed to "synchronizing" and "measuring round trip delay" are not adequately described in the specification and drawings. Applicants respectfully disagree.

As discussed above, the elements directed to "synchronizing" and "measuring round trip delay" are clearly described at least in Figs. 8a-8d and paragraphs [0116] and [0126] of the specification. The specification clearly discloses that the second interface is synchronized with the various ONUs so that they can communicate and that the round trip delay between the second interface and the ONUs is measured. If the Examiner further contends that the specification does not adequately enable such elements, Applicants respectfully request the Examiner specifically point out why such elements are not enabled.

As such, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 5, 39, and 45 under 35 U.S.C. § 112, first paragraph.

## IV. Claim Rejections Under 35 U.S.C. § 112, second paragraph

On page 4 of the Office Action, Claims 5-12, 16-18, 22-29, 33-35, 39-41, 45-52, and 57 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Independent Claims 5, 12, 16, 18, 29, 33, 35, 39, 41, and 45 have been amended. Applicants respectfully submit that Claims 5, 12, 16, 18, 29, 33, 35, 39, 41, and 45 satisfy the requirements of 35 U.S.C. § 112, second paragraph.

Amended independent Claim 5 recites, in part, "receiving affected traffic at the second interface via the optical line terminal, wherein the affected traffic comprises traffic from the first interface that was disrupted by a failure associated with the degradation in power level" and "sending the affected traffic to at least one of the plurality of optical network units." Amended independent Claim 12, although different in scope, includes similar elements. Amended independent Claim 16 recites, in part, that "the disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located." Amended independent Claims 18, 22, 29, 33, 35, 39, 41, and 45, although different in scope, recite similar elements. Applicants respectfully submit that support for these elements can be found at least in paragraphs [0122], [0125], and [0134] of the specification. For example, paragraph [0122] states (with emphasis added):

> For the colocation case (FIG. 8a), the node where interfaces 80 and 86 are located controls directly both interfaces. When a fiber cable break occurs, after detecting and diagnosing which the affected ONUs are, an OLT 91 in FIG. 9 updates its internal routing table without advertising a PON failure to the rest of the routers in an external network, thus keeping protection switching local and quick. The traffic destined/originated to the affected ONUs will be sent/received through interface 80 instead of interface 86.

Paragraph [0125] states, in part, that "[i]nterface 86 notifies the router that it is attached to, to forward the affected downstream traffic to interface 80." Paragraph [0134] of the specification further states that (with emphasis added):

> Optical protection switching provides a fast detection solution for detecting cable breaks. It was described earlier that there exists a connection between the two interfaces (other than the optical medium between the interfaces). This enables fast **rerouting** of information of affected ONUs. However, it must be noted that the

> Internet Protocol (IP) layer is able to learn the altered network topology without direct signaling between the OLTs, but this learning may take many seconds where packets are lost. This solution is therefore more ineffective than the solutions described herein.

On page 4 of the Office Action, the Examiner asserted that "[i]t is unclear how the system transmitting or sending the disrupted traffic form the first interface to the second interface over a fiber when the fiber is broken." As recited, for example, in Claim 16 and described in paragraphs [0122] and [0134] above, the "disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located." As such, the information can be efficiently rerouted without requiring transmission over the broken fiber.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of Claims 5-12, 16-18, 22-29, 33-35, 39-41, 45-52, and 57 under 35 U.S.C. § 112, second paragraph.

## V. Claim Rejections under 35 U.S.C. § 103

In Sections 7 through 10 of the Office Action, Claims 5-12, 16-18, 22-29, 33-35, 39-41, 45-52, and 57 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 6,351,582 to Dyke et al. (hereinafter "Dyke") and U.S. Patent No. 6,657,579 to Foltzer (hereinafter "Foltzer") in view of various other references. More specifically:

- Claims 5-7, 39-40, 45-47, and 57 were rejected over Dyke in view of Foltzer, and further in view of U.S. Patent Application Publication No. 2004/0202174 to Kim et al. (hereinafter "Kim");
- Claims 8-11 and 48-51 were rejected over Dyke in view of Foltzer and Kim, and further in view of U.S. Patent Application Publication No. 2002/0093714 to Tokita et al. (hereinafter "Tokita");

- Claims 12, 16-18, 22-24, 29, 33-35, 41, and 52 were rejected over Dyke in view of Foltzer, and further in view of U.S. Patent Application Publication No. 2003/0133460 to Lee et al. (hereinafter "Lee"); and
- Claims 25-28 were rejected over Dyke in view of Foltzer and Lee, and further in view of Tokita.

Claims 5, 12, 16, 18, 22, 29, 33, 35, 39, 41, 45, and 52 have been amended. Amended independent Claim 5 recites, in part (with emphasis added):

> receiving affected traffic at the second interface via the optical line terminal [at which the first and second interfaces are co-located], wherein the affected traffic comprises traffic from the first interface that was disrupted by a failure associated with the degradation in power level; and
>
> sending the affected traffic from the second interface to at least one of the plurality of optical network units.

Amended independent Claim 12, although different in scope, recites some similar elements. Amended independent Claim 16 recites, in part (with emphasis added):

> transmitting disrupted traffic from the first interface to the second interface for further transmission to at least one of the plurality of optical network units, wherein the disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located.

Amended independent Claims 18, 22, 29, 33, 35, 39, 41, and 45, although different in scope, recites some similar elements. Applicants respectfully submit that Dyke, Foltzer, Kim, Tokita, and Lee, alone or in any proper combination, fail to disclose, teach, or suggest these elements.

Dyke is directed to a passive optical network having a plurality of optical splitters/combiners and an optical line terminal OLT having a main transceiver and a standby transceiver (see Abstract; Fig. 1). Column 6, lines 13-18 of Dyke states:

> In the event of a fault arising in the network between splitter/combiner arrangements, for example in distribution line 212, then communication to and from some ONUs, for example 264, will continue to be with main transceiver 201 whilst communication with others, for example 263, will switch to the warm standby transceiver 202.

Column 12, lines 23-27 of Dyke states (with emphasis added):

> In the event of a fault arising in the distribution network or main transceiver 701, standby transceiver 702 comes into operation to transmit to the ONUs and process signals received from them.

Accordingly, Dyke discloses switching to a "standby transceiver" in the event of a "fault arising in the network." Applicants respectfully submit that Dyke's disclosure of "switching on a standby transceiver" is not the same as "receiving affected traffic [from the first interface] at a second interface via the optical line terminal" and "sending the affected traffic from the second interface to the optical network units," as recited in Claim 5. Indeed, on page 11 of the Office Action, the Examiner acknowledged that the "combination of Dyke and Foltzer does not disclose ... sending affected downstream traffic of the affected ONUs using the second interface." Similarly, Applicants further submit that Dyke's disclosure of "switching on a standby transceiver" is not the same as "transmitting disrupted traffic from a first interface to a second interface across an optical line terminal," as recited in Claim 16.

After the standby transceiver of Dyke is switched on, communication between the main transceiver and some ONUs will continue, while communication with the other ONUs will be conducted by the standby transceiver. Dyke discloses that when the standby transceiver switches on it only communicates with the ONUs (i.e., it transmits to the ONUs and receives signals from the ONUs). As such, when the standby transceiver of Dyke is in use, the main transceiver (which the Examiner analogized to the first interface of Claim 56) communicates with a first set ONUs, and the standby transceiver (which the Examiner analogized to the second interface of Claim 56) communicates with a second set of ONUs. Nowhere does Dyke disclose any communication between the main transceiver and the standby transceiver across the optical line terminal. In contrast, Claim 5 recites "receiving affected traffic [from the first interface] at a second interface via the optical line terminal" and "sending the affected traffic from the second interface to the optical network units," and Claim 16 recites "transmitting disrupted traffic from a first interface to a second interface across an optical line terminal."

Foltzer is directed to an "optical loop having a bus topology with a pair of optical fibers disposed among a plurality of optical network units" (Abstract). On page 6 of the Office Action, the Examiner relied on Foltzer merely to provide the teaching "monitoring the fault of the optical system based on signal degradation in power level." Foltzer fails to disclose any transmission of information across an optical line terminal between interfaces co-located at that optical line terminal. As such, Foltzer fails to disclose, teach, or suggest "receiving affected traffic [from the first interface] at a second interface via the optical line terminal" and "sending the affected traffic from the second interface to the optical network units," as recited in Claim 5. Indeed, as stated above, the Examiner has acknowledged that the "combination of Dyke and Foltzer does not disclose ... sending affected downstream traffic of the affected ONUs using the second interface." Similarly, Foltzer also fails to disclose, teach, or suggest "transmitting disrupted traffic from a first interface to a second interface across an optical line terminal," as recited in Claim 16.

After acknowledging that the "combination of Dyke and Foltzer does not disclose ... sending affected downstream traffic of the affected ONUs using the second interface," the Examiner relied on Lee as allegedly providing the teaching of "sending affected downstream traffic of the affected ONUs using the second interface." For example, on page 10 of the Office Action, the Examiner stated that "paragraphs 0022, 0028, 0034, 0070, and 0089" of Lee disclose such an element.

Applicants respectfully disagree and submit that Lee, alone or in any proper combination with Dyke and/or Foltzer, fails to disclose, teach, or suggest "receiving affected traffic at the second interface via the optical line terminal [at which the first and second interfaces are co-located], wherein the affected traffic comprises traffic from the first interface that was disrupted by a failure associated with the degradation in power level" and "sending the affected disrupted to at least one of the plurality of optical network units," as recited in Claim 5, and "transmitting disrupted traffic from the first interface to the second interface for further transmission to at least one of the plurality of optical network units, wherein the disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located," as recited in Claim 16.

Lee is directed to a system for configuring "upstream and downstream frames on the basis of a variable-length Ethernet frame" (Abstract). Lee states in paragraph [0022]:

> allowing the OLT to register the ONU requesting an ONU registration in an ONU list after calculating the RTT, give a new ONU ID to the ONU, and transmit a registration response frame including the new ONU ID and the RTT to the ONU requesting the ONU registration.

Lee states in paragraph [0034]:

> allowing the OLT to transmit grant frames to the ONUs in order to grant a bandwidth allocation request, each grant frame including information relating to the number of registered ONUs, an ID of an ONU having a bandwidth request opportunity, a periodic ranging correction value, a grant time offset and a transmission time length

Lee states in paragraph [0070]:

> FIG. 8 is a view showing a format of a registration response frame for an ONU registration response among the PON-function control frames. The registration response frame corresponds to a downstream packet to be used when the OLT 20 informs a corresponding ONU of a registration result after registering the corresponding ONU.

As such, Lee teaches an optical line termination (OLT) that registers an optical network unit (ONU) and transmits a registration response frame to the ONU. The registration response informs the ONU of the registration result and includes an ID of the ONU and a round trip time (RTT). Applicants respectfully submit that a registration result, an ID of the ONU and an RTT are not the same as "disrupted" or "affected traffic." As such, Lee fails to disclose, teach, or suggest "receiving affected traffic at the second interface via the optical line terminal [at which the first and second interfaces are co-located], wherein the affected traffic comprises traffic from the first interface that was disrupted by a failure associated with the degradation in power level," as recited in Claim 5, or "transmitting disrupted traffic from the first interface to the second interface for further transmission to at least one of the plurality of optical network units, wherein the disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located," as recited in Claim 16. Likewise, Lee also fails to disclose, teach, or suggest "sending the affected traffic from the second interface to the optical network units," as recited in Claim 5.

Kim and Tokita, alone or in any proper combination with Dyke, Foltzer, and/or Lee, also fail to disclose, teach, or suggest such elements. Kim is directed to a passive optical network "slave controller for use in a PON ONU system" (Abstract). The PON ONU of Kim is "process[es] in unit of byte outputs an enable signal for a mini-slot payload and receives a byte input signal for enabling usage of an arbitrary MAC (Medium Access Control) technique [for] loading arbitrary data in a mini-slot" (Abstract). Tokita is directed to an "optical transmitter[,] for use in an optical transmitting system based on PDS (Passive Double Star) technology, [that] does not erroneously output an optical signal when the optical transmitter is powered on/off" (Abstract). Both Kim and Tokita, alone or in any proper combination with Dyke, Foltzer, and/or Lee, fail to disclose, teach, or suggest "receiving affected traffic at the second interface via the optical line terminal [at which the first and second interfaces are co-located], wherein the affected traffic comprises traffic from the first interface that was disrupted by a failure associated with the degradation in power level" and "sending the affected disrupted to at least one of the plurality of optical network units," as recited in Claim 5, and "transmitting disrupted traffic from the first interface to the second interface for further transmission to at least one of the plurality of optical network units, wherein the disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located," as recited in Claim 16.

For at least these reasons, Applicants respectfully submit that Dyke Foltzer, Lee, Kim, and/or Tokita, alone or in combination, fail to disclose, teach, or suggest:

> receiving affected traffic at the second interface via the optical line terminal [at which the first and second interfaces are co-located], wherein the affected traffic comprises traffic from the first interface that was disrupted by a failure associated with the degradation in power level; and
>
> sending the affected traffic from the second interface to at least one of the plurality of optical network units

(Claim 5, emphasis added), and

> transmitting disrupted traffic from the first interface to the second interface for further transmission to at least one of the plurality of optical network units, wherein the disrupted traffic is transmitted from the first interface to the second interface across an optical line terminal at which the first and second interfaces are co-located.

(Claim 16, emphasis added). Applicants further submit that Dyke Foltzer, Lee, Kim, and/or Tokita, alone or in combination, also fail to disclose, teach, or suggest similar elements recited in independent claims 12, 18, 22, 29, 33, 35, 39, 41, and 45.

Accordingly, Applicants respectfully submit that Dyke, Foltzer, Kim, Lee, and Tokita, alone or in combination, fail to disclose, teach, or suggest each and every element of independent Claims 5, 12, 16, 18, 22, 29, 33, 35, 39, 41, and 45 (and their associated dependent claims). More specifically, dependent Claims 6, 7, 40, 46, 47, and 57 were rejected over the combination of Dyke, Foltzer, and Kim; dependent Claims 8-11 and 48-51 were rejected over the combination of Dyke, Foltzer, Kim, and Tokita; dependent Claims 17, 23, 24, 34, and 52 were rejected over the combination of Dyke, Foltzer, and Lee; and Claims 25-28 were rejected over the combination of Dyke, Foltzer, Lee, and Tokita. Applicants respectfully submit that these claims are allowable of the combination of Dyke, Foltzer, Lee, Kim, and/or Tokita based at least on their dependent from independent Claims 5, 12, 16, 18, 22, 29, 33, 35, 39, 41, and 45.

As such, Applicants respectfully request reconsideration and withdrawal of the various rejections in Sections 7-10 of the Office Action of Claims 5, 12, 16, 18, 22, 29, 33, 35, 39, 41, and 45 (and their associated dependent claims) under 35 U.S.C. § 103(a).

* * *

It is submitted that each outstanding objection and rejection to the Application has been overcome, and that the Application is in a condition for allowance. Applicants respectfully request consideration and allowance of all pending claims.

It should also be noted that although arguments have been presented with respect to certain claims herein, the recited subject matter as well as various other subject matter and/or combinations of subject matter may be patentable for other reasons. Further, the failure to address any statement by the Examiner herein should not be interpreted as acquiescence or agreement with such statement. Applicants expressly reserve the right to set forth additional and/or alternative reasons for patentability and/or allowance with the present Application or in any other future proceeding, and to rebut any statement presented by the Examiner in this or other papers during prosecution of the present Application.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present Application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this Application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extension of time is needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extension fee to Deposit Account No. 19-0741.

Respectfully submitted,

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